Combining Real-Time TDWR Data with NEXRAD Data for Nowcasting and Numerical Weather Prediction

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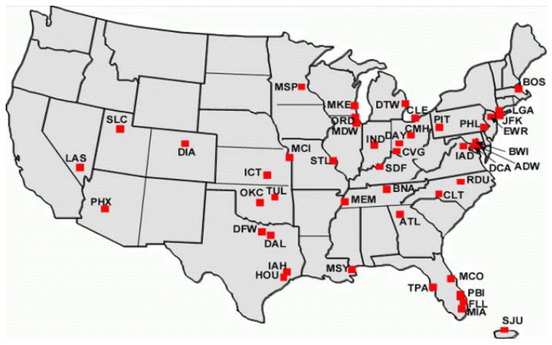
Abstract

Recently the TDWR radars were connected to the NWS networks for purpose of generating and distributing Level-III radar products. CAPS sees this as an opportunity for adding TDWR Reflectivity and Radial Velocity data to our 3DVAR analyses to improve low-level coverage and improve 3-D velocity analysis in our real-time products. CAPS gained access to the Level-II TDWR data in the Dallas area thanks to cooperation among the NOAA Radar Operations Center, NWS Southern Region and the National Severe Storms Lab. CAPS will use these data in real-time experiments and measure their impact in the DFW testbed. We are also evaluating the possible benefits of combining NEXRAD and TDWR elsewhere in the US.

TDWR Radars in the United States

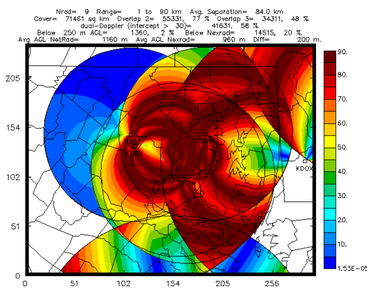


45 Radars in 27 States + Puerto Rico

TDWR and WSR-88D Technical Specifications
(NOAA/NWS Office of Science and Technology)

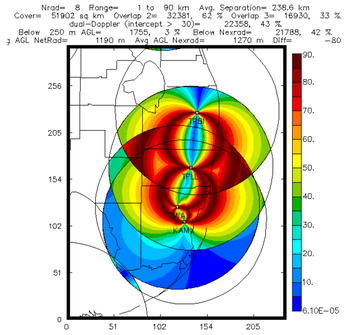
	TDWR	WSR-88D
Transmitter		
Band	C Band	S Band
Wavelength	5.3 cm	10.5 cm
Peak Power	250 kW	750 kW
Polarization	Linear Horizontal	Dual-Pol
Maximum Reflectivity Range	460 km	460 km
Minimum Unambiguous Doppler Range	90 km	115 km
Maximum Velocity Range	90 km	230 km
Range Resolution Reflectivty	150 m (out to 135 km) 300 m (135 km – 460 km)	250 m
Range Resolution Velocity	140 m	250 m
Antenna		
Beam Width	0.55 Degrees	0.95
Power Gain	50 dB	45.5 dB
Scan Strategies Clear Air/Monitor Mode	Scan Time: 6 min	Scan Time: 6 – 10 min
	Number of Scans: 17	Number of Scans: 5
Severe/Hazardous Mode	Scan Time: 6 min	Scan Time: 5 min
	Number of Scans: 23	Number of Scans: 9 - 14

NEXRAD & TWDR Dual-Doppler Angle Analysis



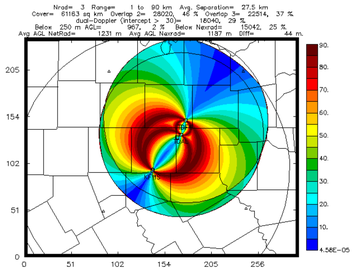
Washington, DC Area

NEXRAD: KLWX, KDOX, KAKQ, KDIX, KCCX
TDWR: TADW. TBWI, TDCA, TIAD



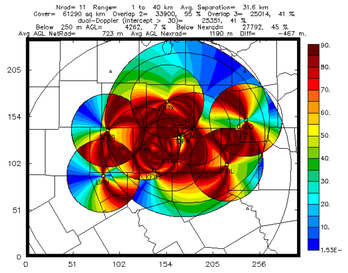
Miami, FL Area

NEXRAD: KBYX, KAMX, KMLB
TDWR: TMIA. TFLL TPBI



Dallas-Fort Worth, TX Area

NEXRAD: KFWS
TDWR: TDAL, TDFW



Dallas-Fort Worth Testbed

NEXRAD: KFWS
TDWR: TDAL, TDFW
X-Band Network: 8 Radars

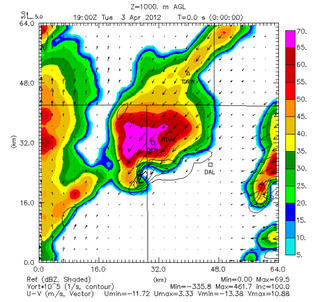
Real-Time Analyses, Assimilation and Forecast System DFW Testbed

3DVAR Analyses
32 Processors MPI
5-minute Interval
400-m grid spacing
Wind and Reflectivity
Run continuously

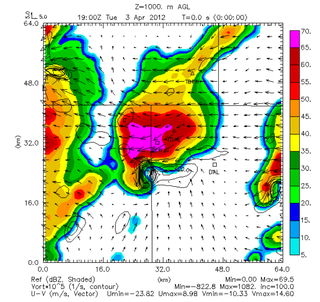
Assimilation/Forecasts
3DVAR and ARPS
160 processors MPI
10 minute interval
1-km grid spacing
Wind and Reflectivity Assim
2-hour Forward Forecast

TDWR Impact on Analysis

1-km AGL Reflectivity, Wind and Vorticity

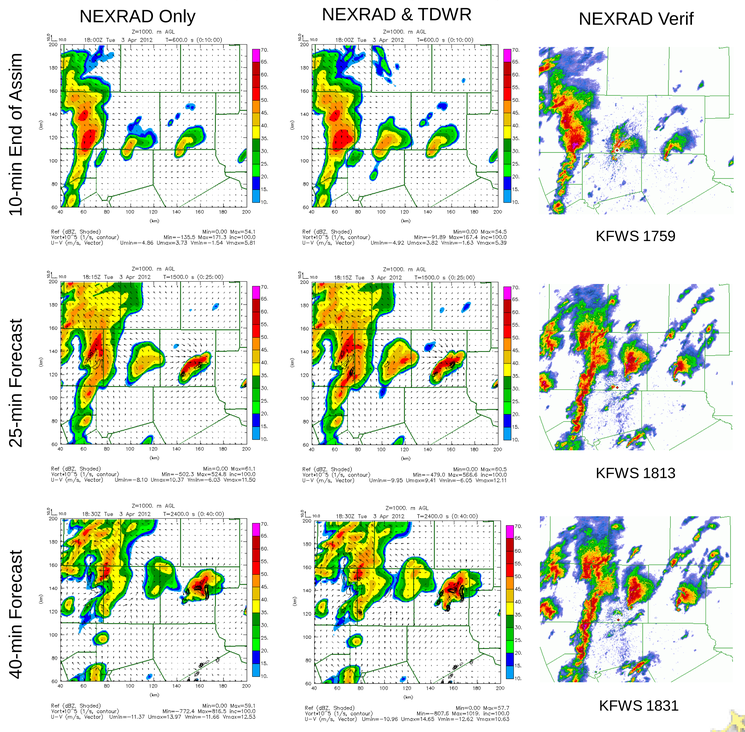


KFWS NEXRAD Only



KFWS, TDFW (TDWR) & TDAL (TWDR)

April 3, 2012
Sample NEXRAD+TDWR Forecast at 1800 UTC
(CASA Radars net yet deployed)



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